

REMARKS

By the present Amendment, Applicant has amended claims 1, 5, 9, and 12 to more appropriately define the present invention; and added claims 21-40 to further define Applicant's invention. Claims 1-40 are pending in the above-captioned patent application.

In the Office Action, the Examiner rejected claims 1, 2, and 4 under 35 U.S.C. § 102(b) as being anticipated by Watanabe et al. (JP 401152274A); rejected claims 5, 6, and 8 under 35 U.S.C. § 102(b) as being anticipated by Chiba (JP 405259133A); rejected claims 9 and 12 under 35 U.S.C. § 102(b) as being anticipated by Nagashima et al. (U.S. Patent No. 5,129,958); rejected claims 3 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Watanabe et al.; rejected claims 7 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Chiba; rejected claims 10, 11, 13, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Nagashima et al. in view of Watanabe; and rejected claims 16, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Nagashima et al.

Applicant notes that claim 14 has not been rejected over any prior art and, is therefore deemed to recite allowable subject matter. Applicant further respectfully traverses the rejection of claims 1-13, and 15-20 as set forth in the Office Action for the following reasons.

Rejection under 35 U.S.C. § 102(b)

In order to properly establish that a reference anticipates Applicant's claimed invention under 35 U.S.C. § 102, each and every element of each of the claims at issue must be found, either expressly described or under principles of inherency, in that single reference. Furthermore, “[t]he identical invention must be shown in as complete detail

as is contained in the ... claim." See M.P.E.P. § 2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1126, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

Claims 1, 2, and 4

Applicants respectfully traverse the rejection because Watanabe et al. does not disclose each and every element of Applicant's claimed invention.

Claim 1, as amended, recites a method of purging a semiconductor apparatus comprising, among other things, "a step of purging the cleaning gas remaining in the chamber by causing a gas containing hydrogen to flow into the chamber after the step of etching the CVD-deposited film by using the cleaning gas," and "monitoring the cleaning gas remaining in the chamber to detect completion of the purge of the cleaning gas."

In contrast, the Abstract of Watanabe et al. discloses that "molecular hydrogen preferably diluted with inert gas such as N₂ and Ar is allowed to flow in the operation system. Thereby, chemical bonding between the inner wall surface in the operation system or the surface of amorphous Si and the pollutant is cut and bonding of the pollutant and hydrogen is freshly formed and this pollutant is discharged to the outside of the operation system." (Abstract attached). The Abstract of Watanabe et al., however, is silent as to at least "monitoring the cleaning gas remaining in the chamber to detect completion of the purge of the cleaning gas."

Therefore, Watanabe et al. does not disclose each and every element of claim 1 and the rejection of claim 1 under 35 U.S.C. § 102(b) is improper. Accordingly, Applicant respectfully requests the Examiner to withdraw the rejection of claim 1 under

35 U.S.C. § 102(b) and the claim allowed. Claims 2 and 4 are also allowable at least in view of their dependency from allowable claim 1.

Claims 5, 6, and 8

Applicants respectfully traverse the rejection because Chiba does not disclose each and every element of Applicant's claimed invention.

Claim 5, as amended, recites a method of purging a semiconductor manufacturing apparatus comprising, among other things, "a step of monitoring the cleaning gas remaining in the chamber to detect completion of the purge of the cleaning gas."

Applicant advises that Chiba is silent as to at least "a step of monitoring the cleaning gas remaining in the chamber to detect completion of the purge of the cleaning gas," as recited in claim 5.

In view of the above-described deficiencies of Chiba, Applicant submits that claim 5 is allowable, and claims 6 and 8 are also allowable at least due to their dependence from claim 5.

Claims 9 and 12

Applicants respectfully traverse the rejection because Nagashima et al. does not disclose each and every element of Applicant's claimed invention.

Claim 9, as amended, recites a method of purging a semiconductor manufacturing apparatus comprising, among other things, "a step of monitoring the cleaning gas remaining in the chamber to detect completion of the purge of the cleaning gas."

In contrast, Nagashima et al. discloses a “[using a fluorine plasma] to remove deposition materials from the surfaces of the deposition chamber resulting in the formation of fluorine residues wherein such fluorine residues are contacted with one or more reducing gases which react with the fluorine residues to form either gaseous reaction products removable from the deposition products or solid reaction products which will not interfere with subsequent deposition in the chamber, or mixtures of same.” (Nagashima et al. at col. 4, lines 3-11). Nagashima et al., however, does not teach at least “a step of monitoring the cleaning gas remaining in the chamber to detect completion of the purge of the cleaning gas,” as recited in claim 9.

Therefore, Nagashima et al. does not disclose each and every element of claim 9 and the rejection of claim 9 under 35 U.S.C. § 102(b) is improper. Accordingly, Applicant respectfully requests the Examiner to reconsider and withdraw the rejection of claim 9 under 35 U.S.C. § 102(b) and the claim allowed. Claim 12 is also allowable at least due to its dependence from claim 9.

Rejection under 35 U.S.C. § 103(a)

Applicant respectfully traverses the rejection of claims 3, 7, 8, 10, 11, 13, and 15-20 under 35 U.S.C. § 103(a) because a *prima facie* case of obviousness has not been established by the Examiner.

In order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim elements. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of

ordinary skill in the art, to modify a reference or to combine reference teachings. Third, there must be a reasonable expectation of success. See M.P.E.P. § 2143.

Claims 3 and 17

Applicant respectfully traverses the rejection of claims 3 and 17 under 35 U.S.C. § 103(a) as being unpatentable over Watanabe et al.

As discussed above, regarding the rejection of claim 1 under 35 U.S.C. § 102(b), Watanabe et al. does not alone teach or suggest each and every element of independent claim 1. Since the Examiner has not combined Watanabe et al. with any other reference, and since Watanabe et al. at least fails to teach or suggest each and every element of independent claim 1, as noted above, the Examiner has not established a *prima facie* case of obviousness for claims 3 and 17, which depend from claim 1. Accordingly, Applicant respectfully submits that claims 3 and 17 are also allowable at least in view of their dependency from allowable claim 1.

Claims 7 and 18

Applicant respectfully traverses the rejection of claims 7 and 18 under 35 U.S.C. § 103(a) as being unpatentable over Chiba.

Claims 7 and 18 depend from claim 5. As noted above regarding the rejection of claim 5 under 35 U.S.C. § 102(b), Chiba fails to teach or suggest each and every element of independent claim 5. Since the Examiner has not combined Chiba with any other reference, and since at least because Chiba fails to teach or suggest each and every element of independent claim 5, as noted above, the Examiner has failed to establish a *prima facie* case of obviousness for dependent claims 7 and 18.

Accordingly, Applicant respectfully submits that claims 7 and 18 are also allowable at least in view of their dependency from allowable claim 5.

Claims 10, 11, 13, and 15

Applicant respectfully traverses the rejection of claims 10, 11, 13, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Nagashima et al. in view of Watanabe.

Claims 10 and 11 depend from claim 9 and claims 13 and 15 depend from claim 12. Independent claims 9 and 12, although different in scope, each recite, among other things, “a step of monitoring the cleaning gas remaining in the chamber to detect completion of the purge of the cleaning gas.” As discussed above, regarding the rejections of claims 9 and 12, neither Nagashima et al. nor Watanabe disclose at least this step. Therefore, Nagashima et al. and Watanabe, either taken alone or in combination, fail to teach or suggest each and every element of independent claims 9 and 12, and the Examiner has failed to establish a *prima facie* case of obviousness for the claims that depend from claims 9 and 12. Accordingly, Applicant respectfully submits that claims 10 and 11, which depend from claim 9, and claims 13 and 15, which depend from claim 12, are also allowable at least in view of their dependency from allowable claims 9 and 12.

Claims 16, 19, and 20

Applicant respectfully traverses the rejection of claims 16, 19, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Nagashima et al.

Claims 16 and 20 depend from claim 12 and claim 19 depends from claim 9. As discussed above, regarding the rejection of claims 9 and 12 under 35 U.S.C. § 102(b), Nagashima et al. fails to teach or suggest each and every element of independent

claims 9 and 12. Since the Examiner has not combined Nagashima et al. with any other reference, and since at least because Nagashima et al. fails to teach or suggest each and every element of independent claims 9 and 12, as noted above, the Examiner has failed to establish a *prima facie* case of obviousness for the claims that depend from claims 9 and 12. Accordingly, Applicant respectfully submits that claims 16, 19, and 20, which depend from claims 9 and 12, are also allowable at least due to their dependence from allowable claims 9 and 12.

New claims 21-40

Claims 21-25 depend from claim 1; claims 26-30 depend from claim 5; claims 31-35 depend from claim 9; and claims 37-40 depend from claim 12. At least in view of their dependence from claims 1, 5, 9, and 12, newly added claims 21-40 are neither anticipated by nor obvious over the applied references. Accordingly, Applicant respectfully requests the Examiner to allow claims 21-40.

Conclusion

In view of the foregoing, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: November 29, 2004

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Attachments: Abstract of Watanabe et al.



Document Summary



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Email Link:

Document JP 01-152274 A2

ID:

Title: METHOD FOR REMOVING POLLUTANT AFTER CHLORINE FLUORIDE
CLEANING IN FILM FORMING OPERATION SYSTEM

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Int'l Class: C23C 16/44 A; B01J 19/00 B; H01L 21/205 B; H01L 21/302 B

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Abstract:

PURPOSE: To rapidly and intensively remove pollutant in a reaction chamber due to specified fluorine-base cleaning gas at low cost by allowing H₂ to flow in a treatment operation system incorporating the above-mentioned cleaning gas after cleaning treatment and removing pollutant with hydrogen molecule.

CONSTITUTION: Fluorine-base cleaning gas incorporating one or more kinds selected from among ClF, ClF₃ and ClF₅ is introduced into a treatment operation system in which a member consisting of metallic substance such as Si, Ti and W or these compds. has been produced. After subjecting one part of the above-mentioned member to cleaning treatment, pollutant which has been produced from the above-mentioned gas and remains in the film forming treatment operation system is removed by the following method. In other words, molecular hydrogen preferably diluted with inert gas such as N₂ and Ar is allowed to flow in the operation system. Thereby, chemical bonding between the inner wall surface in the operation system or the surface of amorphous Si and the pollutant is cut and bonding of the pollutant and hydrogen is freshly formed and this pollutant is discharged to the outside of the operation system. Further, this pollutant is F, F⁻, Cl and Cl⁻, etc.

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